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 Bureau of Entomology and Plant Quarantine

## A STURDY BUT COMPACT SOIL SIFTER FOR FIELD USE

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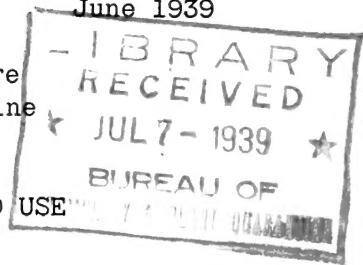
In order to examine heavy sand-loam soils of tobacco fields for the determination of the wireworm population, a soil-sifting apparatus was developed which was similar to those previously described by workers in California 1/ and Washington 2/ but differed in several important respects. It was desired to have a sifter which was portable and of a size that would permit it to be rolled between the tobacco rows at setting time, yet one which would be sturdy enough to handle heavy loads of samples and to stand constant usage. The present machine, which is capable of sifting five 1-cubic-foot samples in 30 minutes at a rate which does not prevent close observation, is believed to meet these requirements. It may be constructed by any competent iron-worker at an approximate cost of \$60, not including the gasoline engine, which may be secured for about \$30 additional.

The soil sifter is pictured in figures 1 and 2. The body frame measures 30 by 24 by 6 inches and is constructed of 6-inch strap iron having a 2-inch strap band riveted to the top edge for strength and a  $1\frac{1}{4}$ -inch angle iron riveted to the bottom. This retains in place the several wood-framed screens of hardware cloth of various meshes, which may be changed to suit the condition and type of the soil. In these investigations two screens of hardware cloth with meshes of  $\frac{1}{4}$  inch and  $\frac{1}{8}$  inch, and one screen of  $\frac{1}{8}$ -inch mesh hardware cloth covered with 18-mesh window screening, are used.

1/ Campbell, R. E., and Stone, M. W. Soil Sifters for Subterranean Insects. Circular ET-49, May 1935, illus.

2/ Lane, M. C., and Shirck, F. H. A Soil Sifter for Subterranean Insect Investigations. Jour. Econ. Ent. 21: 934-936, illus. 1928.

Lane, M. C., and Shirck, F. H. A Mobile Soil Sifter. Circular ET-70, January 1936, illus.



The body of the sifter is supported on four uprights of  $1\frac{1}{2}$ -inch cold-rolled stock,  $\frac{1}{2}$  inch thick, which are movably attached by a  $\frac{7}{8}$ -inch iron rod, and at the other end are similarly attached to the wooden frame support. These uprights are  $18\frac{1}{2}$  inches in height from the center of one rod to the center of the other. Holes drilled in the points of attachment allow oiling.

By means of a brazed motorcycle connecting rod, 11 inches long, the body of the sifter is attached to an 8-inch bicycle sprocket (fig. 1). This turns on a steel shaft (1-3/16 in.) held by two pillow blocks (fig. 2) and is connected by roller-block bicycle chain to another similar sprocket, which is connected by bicycle chain to the motor (fig. 3). This double attachment relieves strain on the motor and assembly in starting and prevents bucking by the machine. The roller-block chain costs more than the usual block bicycle chain but is stronger and does not wear so quickly.

Power is provided by a second-hand  $\frac{3}{4}$ -horsepower, air-cooled gasoline motor of the type commonly used on washing machines and power dusters. This is equipped with a foot-pedal starter and muffler and is improved by use of a carburetor air cleaner. The wooden frame to which the sifter is fastened is  $23\frac{1}{2}$  inches wide by 46 inches, allowing space for attachment of the motor. The apparatus can be wheeled by one man between the tobacco rows by the use of demountable wheels, or dragged by two or three men. After the tobacco is well grown, however, it is advisable to leave the sifter at the ends of the rows, and carry the soil samples to it in buckets.

The specifications for the principal parts of the soil sifter are as follows:

<u>Sifter body</u>	24 in. wide, 30 in. long, 6 in. high
angle iron (6 lbs.)	$1\frac{1}{4}$ x $1\frac{1}{8}$ x $\frac{3}{8}$ in.
band iron (4 lbs.)	2 in. wide x $\frac{1}{8}$ in.
	<u>Approx. cost:</u> \$3.85

<u>Shaker assembly</u>	20 in. high
uprights, U-shaped (1 lb.)	C. R. stock, $1\frac{1}{2}$ x $\frac{3}{8}$ x 48 in.
rigid pillow blocks (4)	1-3/16 in. dia.
steel rods, (2 lb. cut)	1-3/16 in. dia.
bicycle sprockets (2)	8 in. dia.
bicycle sprockets (1)	3 in. dia.
roller bicycle chain	6 feet long
used motorcycle con rod	brazed to 11 in. long
platforms	$8 \times 8 \times \frac{3}{8}$ in. iron stock
	<u>Approx. cost:</u> \$14.85

<u>Uprights assembly</u>	18 $\frac{1}{2}$ in. high (center to center)
uprights (9 lbs.)	1 $\frac{1}{2}$ x $\frac{1}{2}$ x 22 $\frac{1}{2}$ in. machine steel
braces and attachments (4 lbs.)	1 $\frac{1}{2}$ x $\frac{3}{8}$ in. iron stock
riding bars	$\frac{7}{8}$ in. dia. and 24 in. long
machine bolts (24)	$\frac{3}{8}$ x 6 in.

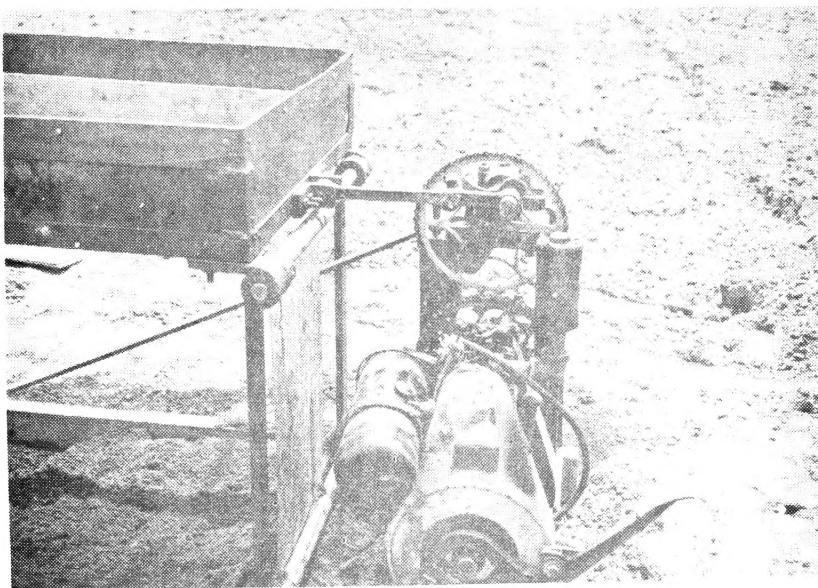
Approx. cost: \$7.97

motor	$\frac{3}{4}$ hp., gasoline, single cylinder, air cooled
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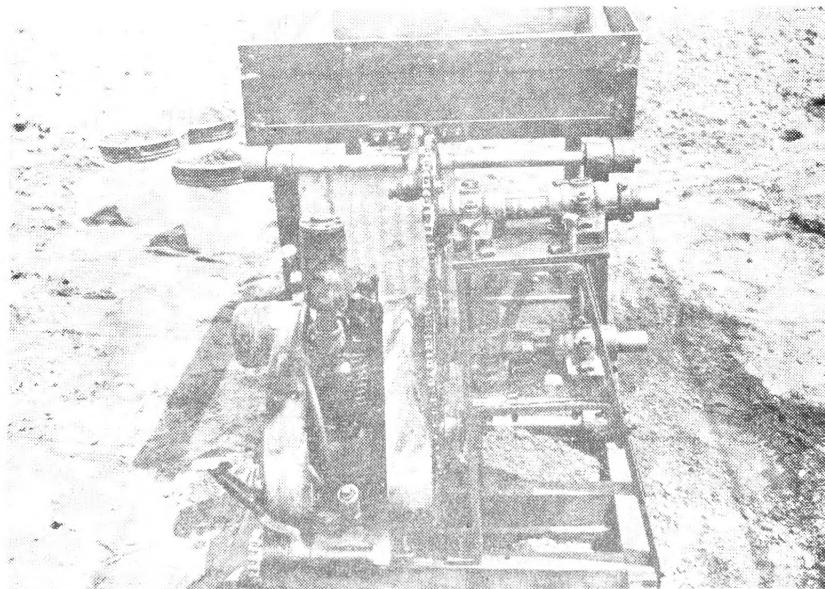
Approx. cost: \$36

The sifter can easily be assembled in about 30 hours, including all forge work and drilling. Screens for the sifter can be constructed from 3-inch pine boards and hardware cloth of the appropriate mesh. Construction details are shown in the diagram (fig. 3).





**Figure 1.**--Close-up view of engine, chain, and eccentric assembly of soil-sifting apparatus. Windsor, Conn., June, 1938.



**Figure 2.**--General view of soil sifter, showing screen in place. Windsor, Conn., June, 1938.



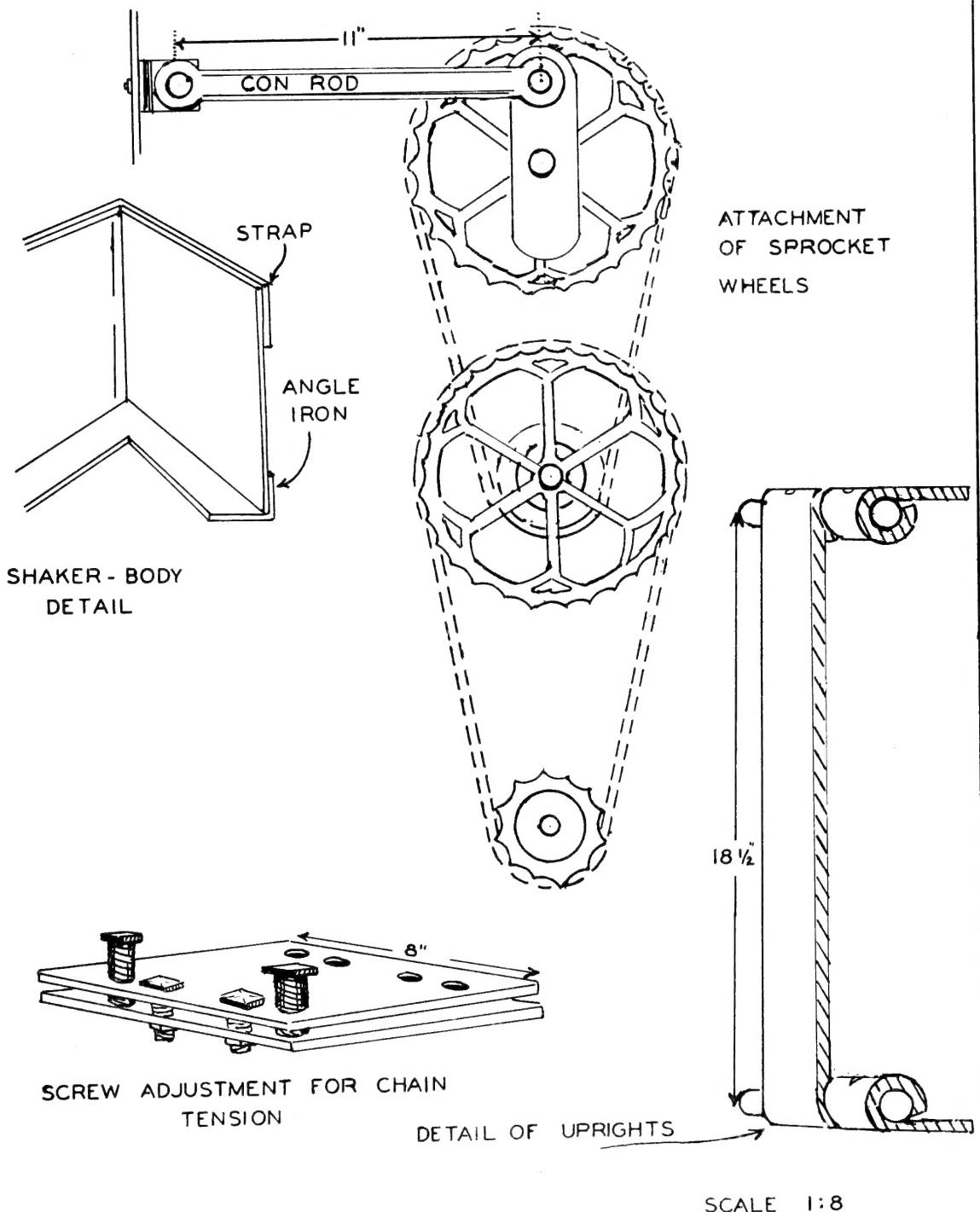


Figure 3.—Diagram of essential portions of soil sifter.

